TMCUpdate
TRANSPORTATION MANAGEMENT CENTER POOLED FUND STUDY
U.S. Department of Transportation
Federal Highway Administration
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WHAT'S INSIDE

HOW TO JOIN...

Agencies may join the TMC Pooled Fund Study at anytime during the year by committing funds at a level agreed upon by existing participants (members) in the study. The TMC pooled fund study was approved for 100 percent State Planning and Research Program funding. Any noncommercial agency or organization that is responsible for the management and operation of any portion of the surface transportation system is welcome to participate.

State transportation agencies interested in joining the TMC Pooled Fund Study can submit funding commitment online at the Transportation Pooled Fund Program web site at: **http://www.pooledfund.org.** (see Solicitation No. 870; SPR-2(207))

Other agencies should complete and submit the TMC Pooled Fund Study commitment form downloadable at the TMC Pooled Fund Study web site at: **http://tmcpfs.ops.fhwa.dot.gov.**

Potential Projects for 2006

The TMC Pooled Fund Study has identified 13 potential project ideas and concepts to consider pursuing in 2006. The members are currently reviewing and performing initial prioritization on the project ideas and concepts. Based on members' feedback, top-ranked project ideas will be retained for further consideration. The members will further review and prioritize the retained project ideas at the annual meeting that will be held on June 14-15, 2005 in Providence, Rhode Island. Weighing a prioritized list of needs against the available funding, the members will select top-ranked projects to pursue in 2006.

The 13 project ideas and concepts that are currently under consideration are:

- TMC Staffing & Scheduling for Day-to-Day Operations, Phase 2 Software Development
- Requirements and Position Descriptions for TMC Support Staff
- Impacts of Vehicle-Infrastructure Integration on TMC Operations
- Surface Street Operational Plans for Coordinated Management
- Planned Special Events Toolbox
- Developing and Disseminating Travel Time Information
- Driver Use of Real-Time Travel Time Information Using Changeable Message Signs
- Displaying Travel Information at Approaches to Freeway Entrances
- Best Practices for Road Condition Reporting Systems
- TMC Workshop Development and Delivery, Phase 2: Additional Workshops
- Methodologies to Measure and Quantify TMC Benefits
- Techniques for Managing Service Patrol Operations
- Signal Operations Handbook

Descriptions of the project ideas and concepts can be viewed online via http://tmcpfs.ops.fhwa.dot.gov/meetings/uploaded_files/Attachment%202%20-%202005%20Project%20Proposals%2004-19-2005.doc. ■

Feature Article: A State-of-the-Art in Online Traffic Network State Estimation and Prediction

The success of ITS technology deployments relies on the availability of timely and accurate estimates of prevailing and emerging traffic conditions. As such, there is a strong need for a "traffic prediction system." The needed system is to utilize advanced traffic models to analyze data, especially real-time traffic data, from different sources to estimate and predict traffic conditions so that pro-active ATMS and ATIS strategies can be implemented to meet various traffic control, management, and operation objectives.

To meet the need for a traffic prediction system and to help address complex traffic control and management issues in the dynamic ITS environment, the FHWA initiated a Dynamic Traffic Assignment (DTA) research project in 1995. The main objective of this research project is to develop a deployable real-time Traffic Estimation and Prediction System (TrEPS) to meet the information need in the ITS context.

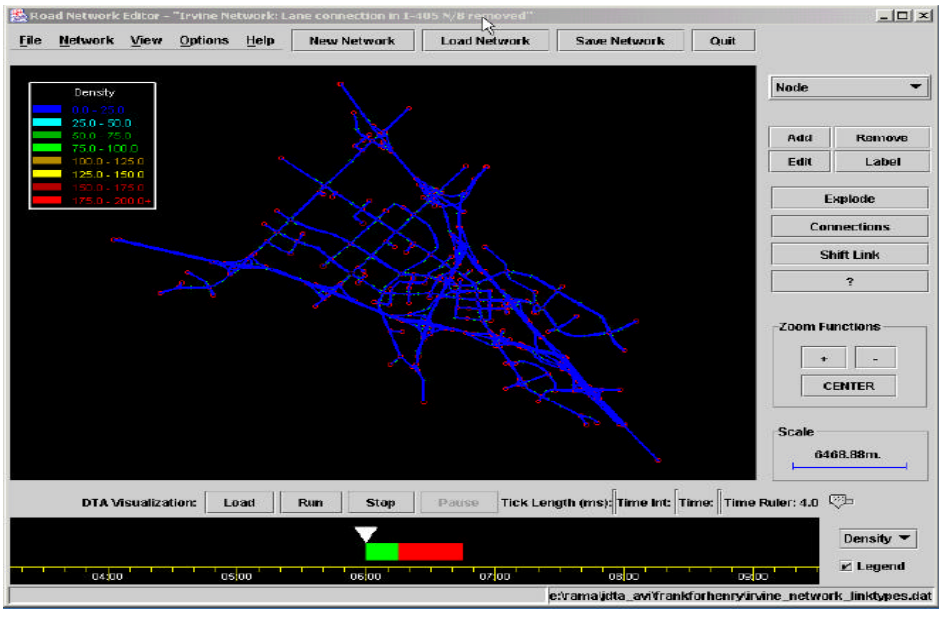
In October 1995, two parallel research contracts were awarded to Massachusetts Institute of Technology (MIT) and the University of Texas at Austin (UTX) with a follow-up development and support at the University of Maryland (UMD), respectively. Each team was required to develop a prototype of TrEPS demonstrating its potential for real time application capability. After three years of intensive R&D efforts, two prototype TrEPS were developed. The two prototype TrEPS developed by MIT and UTX/UMD are named DynaMIT-R and DYNASMART-X, respectively. Both systems are capable of providing predictive traffic information (speeds, densities, and queues/flows) based on a rolling-horizon implementation of an assignment-simulation framework. Both systems can be operated in a distributed computation mode in support of real-time operations, including data synchronization, self-calibration of system parameters, and self-correcting of system states.

These two systems differ in terms of representation of transportation networks and traffic in their models, assumptions regarding driver behavior in response to ATIS and ATMS, approaches to real-time data synchronization, and system design and integration.

Both prototypes were comprehensively tested in an offline environment between 1999 and 2003 with data collected from the microscopic traffic simulator and archived traffic data collected from the Caltrans ATMS testbed located in Santa Ana, California. According to the test results both TrEPS prototypes had shown the potential for real time application. Figure 1 shows that DynaMIT-R generates estimated network state (density in this case) from 6:00am to 6:15am and predicted network state from 6:15am to 6:45am based on limited data collected from the testbed between 6:00am to 6:15am.

Currently the FHWA is working with the software developers and state and local agencies to conduct initial deployments of the prototypes to investigate functionality, prediction accuracy, computational efficiency, and robustness in the field environment at the following sites:

- Houston, Texas – Partnering with TxDOT to



DynaMIT-R Traffic Prediction

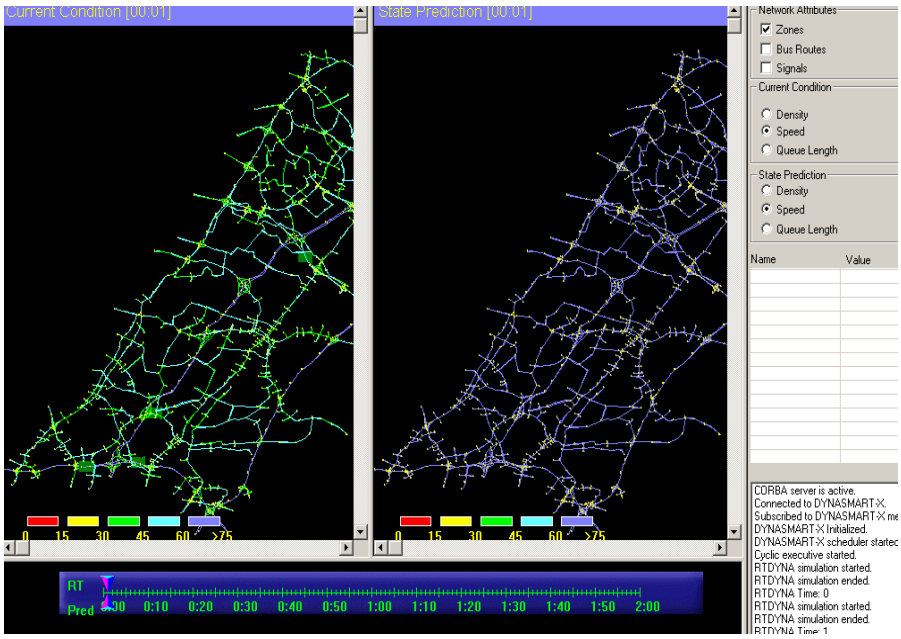
integrate DYNASMART-X with CLAIRE (an intelligent congestion and incident management system) from France and RHODES (a real-time traffic signal control system) at TranStar to perform dynamic traffic assignment management and control for the I-10 west traffic corridor in Houston to alleviate traffic congestion, particularly caused by freeway reconstruction and flooding.

- Los Angeles, California – Working with LA City DOT to incorporate DynaMIT-R and CLAIRE into LA's advanced incident detection algorithm to help detect non-recurring traffic congestion on surface streets and identify proactive signal control strategies to alleviate potential congestions on streets.

- Hampton Roads, Virginia - Working with the University of Virginia and MIT to evaluate DynaMIT-R in Hampton Roads, VA to evaluate traffic prediction capability of DynaMIT-R for online real time traffic management for freeways.

- I-95 corridor, Maryland - Working with MD State Highway Department and UMD to verify the feasibility of establishing an interface between the CHART, the freeway management center, and the DYNASMART-X real-time traffic estimation and prediction system and to determine whether the accuracy and sensitivity of he DYNASMRT-X real-time prediction capability is adequate for comparison of traffic management alternatives. Figure 2 shows the current network state (speed in this case) in the left view and the predicted network state in the right view generated by DYNASMART-X for the project site.

While the need for TrEPS is clear, research and development into the best combination of traffic models, algorithms, granularity (i.e., time and spatial resolutions), ATMS/ATIS operational assumptions, software design, and processing paradigms that will enable TrEPS to perform as required in the field is not complete. In addition, according to a symposium announcement by ITS America, "our knowledge of how motorists respond to traveler information, and how their



DYNASMART-X Traffic

responses affect the functioning of the transportation system, is still in its infancy." This means that traffic models pertaining to travelers' behavioral responses to ATIS information and services are still in the early stage of research. Availability and reliability of online traffic data are also critical for traffic prediction. Nevertheless, it is clear from current research that a widely deployable TrEPS will have to be a complex, distributed software system.

The development of TrEPS, therefore, poses a significant technical challenge to the researchers to address these issues. We are hoping the current field test of DynaMIT-R and DYNASMART-X will help us to address some of these issues.

The readers are encouraged to visit the web site at http://www.dynasmart.com and http://mit.edu/its for detailed information about DynaMIT-R and DYNASMART-X.

For more information, contact: Henry Lieu, 202 493-3273; Henry.lieu@fhwa.dot.gov. ■

Project Progress Reports

Ongoing TMC Pooled Fund Study projects are briefly described in the following paragraphs. Quarterly project progress reports can be accessed on the TMC Pooled Fund Study Web site: http://tmcpfs.ops.fhwa.dot.gov.

"Coordinated Freeway and Surface Street Operational Plans and Procedures"
Purpose: Develop a document that provides technical guidance and recommended practices on how to prepare plans, coordinate activities, and develop procedures and protocols to use in managing travel, controlling traffic, and providing services related to coordinating travel on freeways and arterial roadways.

Champions: Mark Newland, Indiana DOT, and Kamal Hamud, District of Columbia DOT
Status: Final report is currently under editing
Completion Date: Summer 2005
Contact: James Colyar: 202-493-3282; james.colyar@fhwa.dot.gov

"Developing and Using Concept of Operations in Transportation Management Systems"
Purpose: Develop a document that describes the need for a concept of operations for a transportation management system and provides technical guidance and recommended practices for developing and using a concept of operations throughout the system's life cycle.

Champion: Manny Agah, Arizona DOT
Status: Final report has been completed; Outreach materials will be available in Spring 2005
Completion Date: Spring 2005
Contact: Emiliano Lopez: 410-962-0116; emiliano.lopez@fhwa.dot.gov

"Impacts of Dynamically Displaying Messages on Changeable Message Signs"
Purpose: Develop preliminary guidance to practitioners for dynamically displaying messages on CMS and identify and recommend changes or new provisions to the FHWA *Manual on Uniform Traffic Control Devices.* This project will build upon the TMC Pooled Fund Study project "Changeable Message Sign Operation and Messaging Handbook."

Champion: Jeff Galas, Illinois DOT
Status: Data collection has been completed; Currently performing data analysis
Completion Date: Spring 2005
Contact: Tom Granda: 202-493-3365; thomas.granda@fhwa.dot.gov

"TMC Clearinghouse Development and Initiation"
Purpose: Establish a central, one-stop clearinghouse at a Web site that houses a comprehensive database of TMC-related resources. The TMC clearinghouse will facilitate the sharing of information among practitioners and the dissemination of innovative tools, processes, problem-solving efforts, and capacity-building efforts to assist TMC practitioners in performing their duties and achieving the goals of their TMCs.

MEMBER PROFILE

Nick Thompson
RTMC Operations Manager
Minnesota DOT

Mr. Thompson is Operations Manager at Minnesota DOT's Regional Transportation Management Center. As Operations Manager, he is responsible for management of the Twin Cities ramp meter system, for the TMC Control Room operations, Minnesota's 511 system and other traveler information programs, freeway incident responders, and incident management initiatives.

Since February Mr. Thompson has been on assignment as technical project manager of Minnesota's first High Occupancy Toll (HOT) facility, called I-394 MnPASS Express Lane. The HOT Lane opens in May.

Prior to becoming Operations Manager, Mr. Thompson worked on the Integrated Corridor Traffic Management Project. This was an ITS Operational test that included the use of SCATS for arterial signal operations, the deployment of a comprehensive route guidance system for use in major incidents, and the testing of alternative ramp metering strategies

Mr. Thompson is a member of the TRB Freeway Operations Committee, and is just completing his two-year stint as co-chair of the TMC Pooled Fund Study. He holds a Master of Urban Planning degree from the University of Wisconsin-Milwaukee, and a B.A. degree from Gustavus Adolphus College in Minnesota.

Champions: Nick Thompson, Minnesota DOT, and David Kinnecom, Utah DOT
Status: Project initiated in January 2005
Completion Date: May 2006
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov

"Transportation Management Center Business Planning and Plans Handbook"
Purpose: Produce a handbook that provides guidance and best practices on how to develop a TMC business plan. The handbook will also outline business-planning models that were successfully employed by transportation agencies to ensure the long-term sustainability of TMCs and associated ITS applications.

Champion: Monica Kress, California DOT
Status: Draft handbook is available for review.
Completion Date: Summer 2005
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov

"TMC Operator Requirements, Position Descriptions, Phase 2—Interactive Software Tool"
Purpose: Develop an interactive software tool that will embody the content material developed in the Phase 1 project, supplemented as necessary, and provide the functionality needed by TMC managers and other users to support development of useful position requirements and descriptions for TMC operator positions.

Champion: Mark Demidovich, Georgia DOT
Status: Prototype software tool is available; User testing will commence in Spring 2005
Completion Date: Summer 2005
Contact: Tom Granda: 202-493-3365; thomas.granda@fhwa.dot.gov

"TMC Performance Monitoring, Evaluation, and Reporting Handbook"
Purpose: Develop a handbook that will explain the need for performance monitoring and serve as a technical reference that provides guidance and recommended monitoring practices. The handbook will advise how to initiate, sustain, and use information generated from monitoring, evaluating, and reporting on TMC performance and describe roles, responsibilities, functions, and support services as they relate to traffic management.

Champion: Mark Newland, Indiana DOT
Status: Incremental submission of draft chapters began in February 2005. Complete draft handbook is expected in June 2005
Completion Date: December 2005
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov

"TMC Staffing and Scheduling for Day-to-Day Operations"
Purpose: Develop a technical document that will assist TMC managers in making staff workload and scheduling decisions, performing future staffing forecasts, estimating timelines for personnel procurement and recruiting, and analyzing staffing costs and productivity.

Champion: Manny Agah, Arizona DOT
Status: Project initiated in February 2005
Completion Date: Spring 2006
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov

"TMC Pilot Workshop Development and Delivery"
Purpose: Promote the TMC Pooled Fund Study effort and increase awareness of the Study's products and tools to a broader audience base. The focus of this project is a pilot TMC workshop to be held in the summer of 2005. Themes of the workshop will focus on current and future TMC Pooled Fund Study activities and other topics that are recommended.

Champion: John Corbin, Wisconsin DOT
Completion Date: TBA
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov

"Transportation Management Center Operations Manual"
Purpose: Develop a technical document that provides guidance and recommends practices for initiating, developing, maintaining, and using TMC operations manuals. The technical document will be a detailed reference that addresses concepts, methods, processes, tasks, techniques, and other related issues for practitioners to consider in developing an operations manual for a TMC.

Champion: Peter Vega, Florida DOT
Status: First draft version of the handbook is available on the project web page for review.
Completion Date: Fall 2005
Contact: Raj Ghaman: 202-493-3270; raj.ghaman@fhwa.dot.gov ■

Projects Soon to be Initiated

"Regional, Statewide, and Multi-State TMC Concept of Operations and Requirements"
Building off the existing *Developing and Using Concept of Operations in Transportation Management Systems Handbook*, this document would focus on the details on how to develop and use concept of operations and system requirements as it applies to the life cycle of a regional, statewide, or multi-state TMC. This project will be initiated in spring or early summer 2005.

"Procuring, Managing, and Evaluating the Performance of Contracted TMC Services"
The technical document produced will provide guidance and recommended practice to TMC owners and managers in making decisions related to outsourcing portions, or in entirety, of their TMC or transportation management system operation to a private contractor or contractors. The expected project kick-off is in summer 2005.

"Recovery and Redundancy of TMCs"
This project will produce a technical document synthesizing current practices and state of the practices, highlighting technical issues, lessons learned, and recommended practices, and detailing how to plan, develop and implement redundancy design and recover plans for TMCs and transportation management systems. This project will be initiated in summer 2005.

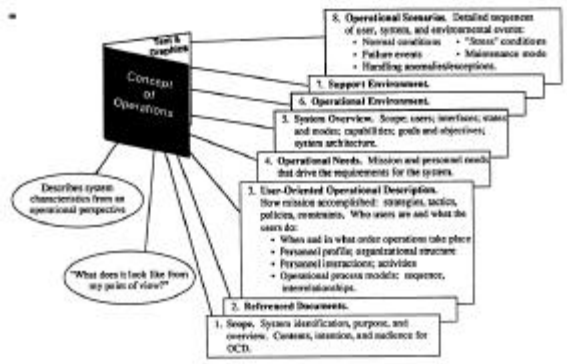
"Integration of TMC and Law Enforcement"
The project will examine and define the concepts, methods, processes, and techniques for integrating the operational and technical functions and personnel of TMCs and law enforcement agencies to achieve a seamless relationship with these two entities. This project is expected to kick-off in summer or fall 2005.

"TMC Clearinghouse Support Services, Phase 2"
This Phase 2 project will continue to enhance and improve the support services for the TMC clearinghouse website that will be available online in Spring 2006. The study will also evaluate consumer feedback and recommendations for enhancing and improving the features and contents of the clearinghouse. ■

New Publications

New TMC Pooled Fund Study Publication

"Developing and Using a Concept of Operations in Transportation Management Systems Handbook"
(January 2005)
This document is to serve as an introductory manual that will aid in the development and use of a concept of operations for TMCs and transportation management systems. The handbook is designed to serve as a reference for individuals involved in the management, planning, design, operation, and maintenance of TMCs and transportation management systems.



On a broad scale, the guide identifies successes and difficulties that transportation management systems have experienced but could be considered in the development process. Since the situation and circumstances are different for each system, highly detailed multi-step processes have not been included as it is the details of each specific system that will mark it for successful development. Testimonials, experiences and guidance from transportation professionals, as well as direct excerpts from their concept of operations documents are included making the manual an active, usable tool.

Companion outreach materials (a primer, presentations, a fact sheet, and a tri-fold brochure) were developed to facilitate and convey key messages and concepts contained in the handbook. These materials highlight how to effectively use and integrate a concept of operations for transportation management systems.

The handbook is available online at http://tmcpfs.ops.fhwa.dot.gov/cfprojects/new_detail.cfm?id=38&new=0.

New Resources and Publications

"Travel Time Messaging on Dynamic Message Signs (DMS) Workshop Meeting Summary" - A Travel Time Messaging on Dynamic Message Signs (DMS) Workshop sponsored by Federal Highway Administration and ITS America was held March 16-17, 2005 at the Georgia Department of Transportation's Transportation Management Center (TMC) in Atlanta, Georgia. Available at http://www.itsa.org/itsnews.nsf/180c9c506bf5856985256c2d00174a12/3db66471af33c76b85256fdc00692b89?OpenDocument.

"Transportation Systems Management and Operations Action Kit" (March 27, 2005) - This collection of one-page papers provides insights and lessons-learned for implementing various operations programs in transportation systems. Available at: http://www.ite.org/management/ActionKit.pdf.

"Understanding the Communications and Information Needs of Elected Officials for Transportation Planning and Operations" (January 2005) - This document is intended to enhance communication with local elected officials and senior appointed officials who play key decision-making roles. Available at: http://www.plan4operations.dot.gov/docs/Comm_with_Elected_Officials_1-5-05rmm.doc.

"Challenges Faced and Tactics Used to Integrate Real-Time State Police CAD Data with the VDOT Richmond District Smart Traffic Center: Lessons Learned Document" (January 2005, FHWA-JPO-05-036) - This document discusses the significant issues encountered during the development effort of integrating the Transportation Management System deployed at the Virginia DOT (VDOT) Richmond District Smart Traffic Center with the real time State Police data coming from the Virginia State Police Computer Aided Dispatch (CAD) system. Available at http://www.itsdocs.fhwa.dot.gov//JPODOCS/REPTS_TE//14115.htm.

"Effects of Catastrophic Events on Transportation System Management and Operations – Comparative Analysis" (May 2004, FHWA-JPO-04-061) - A series of comparative reviews investigates the effects a catastrophic event has on roadways and transit systems. Six case studies of past events were studies and the lessons learned in these instances will be applied to future incidents.

"Effects of Catastrophic Events on Transportation System Management and Operations – August 2003 Northeast Blackout New York City" (April 2004, FHWA-JPO-04-060)

"Effects of Catastrophic Events on Transportation System Management and Operations – August 2003 Northeast Blackout Great Lakes Region" (May 2004, FHWA-JPO-04-059) - The companion case studies above document and examine the impact a crisis has on transportation system facilities and services, particularly focusing on the Blackout that occurred throughout the Northeast on August 14, 2003. The papers emphasize the importance of good communication between agency staff and public officials who first responded to the incident. ■

Event Calendar

TMC Pooled Fund Study Events

June 14-15, 2005	TMC PFS Annual Meeting Providence, Rhode Island.

Other Events

May 17-18, 2005	HOV Pooled Fund Study Annual Meeting, Seattle, Washington.
June 5-7, 2005	IEEE Intelligent Vehicles Symposium, Las Vegas, Nevada.
June 5-9, 2005	Joint Meeting (AASHTO Standing Committee on Planning, Subcommittee on Systems Operations & Management, TRB Freeway Operations Committee, and TRB Regional Transportation Systems Management & Operations Committee), Overland Park, Kansas.
August 7-10, 2005	ITE Annual Meeting Melbourne, Australia.
November 6-10, 2005	12th ITS World Congress San Francisco, California.

MEMBER NEWS

GDOT Previews Web-based Platform at ITS Georgia Workshop

The Georgia Department of Transportation (GDOT) previewed its new, web-based platform for future growth of the state's NaviGAtor intelligent transportation system at a workshop sponsored by the Intelligent Transportation Society of Georgia (ITS Georgia) in February 2005. The new technology, called NaviGAtor Web, extends the award-winning NaviGAtor Intelligent Transportation System and its associated capabilities into a web-enabled environment, accessible anywhere via the Internet. NaviGAtor Web permits rapid, cost-effective deployment of new technologies including cameras and other traffic sensing devices into the NaviGAtor system. The NaviGAtor Web system quickly processes information gathered from sensors and sends traffic alerts to government agencies, the news media and public.

Rhode Island Becomes 23rd State to Launch 511 Services

The Rhode Island Department of Transportation (RIDOT) has launched a new 511 service that will aid drivers by supplying a variety of roadway information that could potentially aid in traffic congestion. The service is free to callers both in and out of the state, and available 24 hours and day, seven days a week. Information that will be readily available includes: anticipated travel time for different routes, bus and train schedules, lane restrictions and tourist information. The system operates on voice commands and telephone keypad prompts. Individuals traveling out of the state may access the service by dialing 1-888-401-4511.

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CONTACTS

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Contribute articles for inclusion in the next TMC Update by June 15, 2005 to: ming_shiun_lee@urscorp.com